

REMARKS

Applicant thanks the Examiner for carefully considering this application and for the courtesy extended during a telephonic interview on June 5, 2003. Please reconsider the application in view of the above amendments and the following remarks.

I. Disposition of Claims

Claims 1-40 are pending in this application. Claim 28 has been amended to clarify the recited invention. No new matter is introduced by the amendment. Claims 1, 15, 21, and 28 are independent. The remaining claims depend, directly or indirectly, from claims 1, 15, 21, and 28.

II. Summary of the Telephonic Interview

During the telephonic interview of June 5, 2003, the Examiner acknowledged that the limitation, "wherein the related data are relevant to a hydrocarbon-producing portfolio," added in the previous response should have been considered limiting. However, the Examiner asserted that the claims as amended could not overcome a combination of the Cwenar and Lu references. However, in light of the fact that the limitation was not properly considered, withdrawal of the finality of this action is respectfully requested.

III. Rejection under 35 U.S.C § 102

Claims 1-3, 5-7, 15, 19-23, and 25 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,893,079 ("Cwenar"). This rejection is respectfully traversed.

The present invention relates to an information management system for managing a hydrocarbon-producing portfolio. A unique problem in managing a hydrocarbon-producing portfolio lies in the diverse nature of the users (e.g., geoscientists, field engineers, well operators, and market analysts), geographical locations of the assets and users (essentially anywhere in the

world), applications/software (e.g., well log analysis, well production analysis, and market analysis), and data types (e.g., seismic data, well log data, well production data, logistical data, contractual data, regulatory data, marketing data, etc.). The users from diverse disciplines in a hydrocarbon-producing portfolio use dissimilar applications to manipulate and generate a large amount of dissimilar types of data. A user may modify a piece of data that would affect many other users using related data. Therefore, timely and accurate flow of information between users is critical to the efficient management of the hydrocarbon production portfolio. Prior to the present invention (i.e., prior to 2000), the Applicant respectfully asserts that there was no method or system for efficiently integrating various dissimilar groups and data types involved in a hydrocarbon-producing portfolio, nor was there any method for automatically updating related data generated and used by dissimilar applications and for providing updated information to users of dissimilar disciplines located at various locations in a timely fashion.

An information management system of the invention comprises a data repository and uses one or more key parameter fields to link dissimilar types of data stored in the data repository. The key parameter field, for example, may be a unique American Petroleum Institute (API) well code or a project code. The dissimilar types of data are relevant to a hydrocarbon-producing portfolio. The data to be managed includes portfolio relevant data and related work product (generally referred to as data) for each of the wells and properties for the hydrocarbon-producing portfolio, as well as other information (cost tables, economic indicators, etc.) relevant to defining, developing, and managing the portfolio. Portfolio relevant data may include, for example, any data relevant to the development of assets in the portfolio, such as geographic data corresponding to existing and proposed well locations, contractual data corresponding to lease obligations, logistical data such as capital equipment availability at well locations, and physical

data such as volumes of estimated hydrocarbon reserves in reservoirs penetrated by existing and prospective wells, for example. (See, *e.g.*, specification, page 16, line 23 - page 17, line 2.).

Timely and accurate flow of information is critical for the management of the hydrocarbon-producing portfolio. Therefore, when any of the applications is used to modify a piece of data having a particular key parameter field, all data linked to that key parameter field are updated in the data repository such that other users will have access to accurate information in a timely manner. In addition, related data residing in databases outside of the data repository and linked to the key parameter field may also be updated. (Specification, p. 22, lines 15-17). For example, if a geoscientist updates the estimate of the porosity of a particular formation, the updated porosity estimate may affect the optimal production rate, the predicted volume of oil reserve, production forecast, etc. In addition, a number of different groups, ranging from accountants to salespeople, may require access to and/or the ability to modify the data associated with a formation. Therefore, the updated data should be provided in a timely manner to all users using the related data.

The information management system of the invention also includes at least one application server, which is adapted to provide a plurality of dissimilar applications to a community of users of dissimilar disciplines. The application server is operatively connected to the data repository, thereby allowing each application to retrieve and update data stored in the data repository. The plurality of dissimilar applications generates and/or manipulates some data, which in turn are updated in the data repository. The updated or newly generated data are linked with related data based on the key parameter field and are made available to other applications. Examples of the plurality of dissimilar applications may include a geo-science application, a

petroleum land management application, a drilling engineering application, a market analysis application, *etc.*

For example, geoscientists may obtain data relating to the geology of a given formation (e.g. lithographic information, strata information, *etc.*). Other logging operations (e.g., neutron and gamma ray logging, or resistivity logging) may be preformed as well. This data may then be sent to the database. Completion engineers then, using a key parameter field, may access the data and use it to design a completion process, i.e. whether to fracture the well (using acid fracturing or hydraulic fracturing), whether to case the well with pipes and concrete and perforate the casing with dynamites, or whether to screen and/or gravel pack the production zone.

Based on this and/or additional information, production engineers can provide a strategy to best produce a given formation. In addition, the production engineers generate data related to production rates, *etc.* Financial analysts may then use the production data to estimate the market value.

Some time later, if a new and improved seismic (or other survey) technique is available, the geoscientists may be asked back to obtain new seismic data, which are then used to update the formation property data in the data repository. The production engineers may then decide to produce the oils at a different rate. These new data are updated in the system. The financial analysts can then use the updated data to perform economic analysis.

In order to link all these dissimilar data and provide updates in a timely fashion, these data are stored in a data repository and linked with related data based on their values in one or more key parameter fields (e.g., an API well code). For example, the seismic data obtained by the geoscientists may be stored in the data repository and associated with other data related to the

same well (based on the same value in the key parameter field). A production engineer may later retrieve these data, using the key parameter field, to estimate the best production rates, while a finance analyst may retrieve the same data, using the same key parameter field, to generate economic data. Thus, the same data in the hands of different users, having different applications, may produce useful information for that particular user. The information management systems and methods, as recited in independent claims 1, 15, 21, and 28, provide seamless transfer of information relating to a hydrocarbon-producing portfolio.

Independent claims 1, 15, 21, and 28 each include the limitations of “a data repository adapted to store related data tied to a key parameter field,” and “wherein the related data are relevant to hydrocarbon-producing portfolio.” In addition, each of these claims includes a limitation of updating related data tied to a key parameter field when other data having the key parameter field is modified. For example, claim 1 includes “wherein the data repository is adapted to be updated with the related data generated by each of the plurality of different applications having the key parameter field.” Claim 15 includes “update any of the stored data having the key parameter field when ones of the plurality of applications modify any of the stored data having the key parameter field.” Claim 21 includes “updating any of the data having the key parameter field when ones of the plurality of applications is used to modify any of the stored data having the key parameter field.” Claim 28 includes “automatically updating corresponding data used by any other one of the applications based on the data generated by using at least one of the applications.”

Advantageously, the claimed invention provides integrated processes and systems for the efficient and timely transfer of dissimilar types of information, data, and knowledge among users of dissimilar disciplines involved in a hydrocarbon-producing portfolio.

In contrast, Cwenar discloses a system for receiving, processing, creating, storing, and disseminating investment information, i.e., “mutual funds, common and preferred shares of stock...high yield corporate bonds and high grade corporate bonds, municipal bonds, United States bills, notes and bonds, mortgage related investments, and short term securities...banker acceptances, repurchase agreements.” (col. 3, lines. 56-63).

Simply put, Cwenar does not teach or suggest the limitations of “related data tied to a key parameter field” and “wherein the related data are relevant to a hydrocarbon-producing portfolio,” as recited in independent claims 1, 15, and 21. Furthermore, Cwenar does not teach or suggest the use of a plurality of different applications, nor does it teach or suggest updating related data tied to a key parameter field when a piece of data having the key parameter field is modified.

Therefore, Cwenar cannot anticipate claims 1, 15, and 21. Claims 2-3, 5-7, 19-20, 22-23, and 25, which depend from claims 1, 15, and 21, should be allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

IV. Rejections under 35 U.S.C § 103

A. Cwenar and Armitage

Claims 4, 16-18, 24, 26, and 27 were rejected under 35 U.S.C. § 103(a) as being obvious over Cwenar in view of U.S. Patent No. 5,475,589 (“Armitage”). This rejection is respectfully traversed.

“To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally,

the prior art reference (or references when combined) must teach or suggest all the claim limitations.” (MPEP § 2143). Furthermore, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Cwenar relates to investment information. Armitage evaluates a very narrow range of seismic data. Neither Cwenar nor Armitage suggests modification of their inventions for use in the other's industry. Cwenar does not suggest combining its system with any scientific applications. Armitage is a scientific application used for evaluating the risk associated with drilling a dry hole. The investment risk factors addressed in Armitage are “geofactors,” specifically “velocities of acoustic energy in sedimentary rock.” (Col. 3, lines 7-15). Cwenar and Armitage are unrelated data processing systems. No common problem exists to be resolved by their combination. Without a common problem, there cannot be a reasonable expectation of success. Even more significantly, the very narrow field of seismic study disclosed by Armitage does not render obvious the methodology of the present invention, which enables a plurality of dissimilar users in dissimilar fields to work as a cohesive unit in producing hydrocarbons. This “global” understanding and cohesion is simply not found in Armitage or Cwenar. Thus, even assuming an *arguendo* that these references were combinable, the present invention could not be rendered obvious.

The Examiner acknowledged that “Cwenar does not disclose that the related data are relevant to a hydrocarbon-producing portfolio.” (Office Action, p. 5). However, the Examiner asserted that Armitage discloses these limitations, citing Col. 4, lines 57-66 and Col. 5, lines 7-14. Column 4, lines 57-66 of Armitage discloses:

Efficient application of the technology taught by the present invention
[translating seismic time data via seismic depth data to seismic

depth/lithology data] may be accomplished by organizing each of its component steps to take place with minimal human intervention. As will be described in detail, material developed and held within the SPIRAL work domain may be effectively used to define, implementing an automated and computerized system, sequence lithology, and also its present and local capability to act as a reservoir, seal, migration route, source or stratigraphic or structural trap of economic interest.

Armitage only concerns using predictive software to determine whether a dry hole is more or less likely to be drilled at one location as compared to another location. Armitage does not disclose a “hydrocarbon-producing portfolio” that includes a community of users of dissimilar disciplines (e.g., exploration engineers, completion engineers, production engineers, marketing personnel, financial analysts, regulatory compliance specialists, etc.) using dissimilar applications to manipulate data of dissimilar types.

The more improvement for predicting the location of oil and gas beneath the earth does not supply any motivation to modify an investment information system analyzing mutual funds, stocks, bonds, etc., or to combine a seismic processing system with a system for analyzing investment information. If the Examiner is relying on personal knowledge for this motivation to combine, Applicant respectfully requests that the Examiner provide an affidavit pursuant to 37 C.F.R. § 1.104(d)(2).

Therefore, independent claims 1, 15, and 21 are patentable over Cwenar and Armitage, whether considered separately or in combination. Dependent claims 4, 16-18, 24, 26, and 27 are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

B. Cwenar and Dembo

Claims 8-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cwenar in view of U.S. Patent No. 5,148,365 (“Dembo”). This rejection is respectfully traversed.

As noted above, Cwenar does not teach or suggest the limitations as recited in claim 1, i.e., “related data tied to a key parameter field, wherein the related data are relevant to a hydrocarbon-producing portfolio,” and “the data repository is adapted to be updated with the related data generated by each of the plurality of different applications having the key parameter field.” Dembo discloses methods for scenario optimization. According to Dembo’s methods, the “scenario parameter values, scenario solutions and scenario probabilities are then used to determine a single solution to the mathematical model which best ‘fits’ the desired system behavior under the uncertainty defined by all of the scenarios considered. The single solution is then used to allocate the resource in the system. The present method is particularly useful in modeling a target portfolio from a number of other financial instruments.” (Abstract). Thus, Dembo does not teach or suggest an information management system of the present invention dealing with dissimilar data for dissimilar disciplines in a hydrocarbon-producing portfolio. In fact, neither Cwenar nor Dembo deals with the petroleum industry. Dembo does not teach or suggest the limitations recited in claim 1 that are missing in Cwenar – a key parameter field, a hydrocarbon-producing portfolio, and updating related data having a key parameter field when one of the plurality of applications modifies a data having the key parameter field. Thus, even if Dembo and Cwenar are properly combinable, they would not teach or suggest all limitations recited in claim 1

Because Dembo fails to provide that which Cwenar lacks with respect to claim 1, claim 1 is patentable over Cwenar and Dembo, whether considered separately or in combination. Therefore, claims 8-11, which indirectly depend from claim 1, are likewise patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

C. Cwenar and O'Shaughnessy

Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over Cwenar in view of U.S. Patent No. 6,484,151 ("O'Shaughnessy"). This rejection is respectfully traversed.

As noted above, Cwenar relates specifically to investment information management system. O'Shaughnessy relates to using a computer to select corporate stocks for investment. (col. 1, lines. 11 and 12). Neither reference teaches an information management system for managing a hydrocarbon-producing portfolio as required by claim 1. In particular, O'Shaughnessy fails to provide that which Cwenar lacks with respect to claim 1 – a key parameter field, a hydrocarbon-producing portfolio, and updating related data having a key parameter field when one of the plurality of applications modifies a data having the key parameter field. Therefore, the combination of Cwenar and O'Shaughnessy neither teaches nor suggests the claimed invention as recited in claim 1. Claim 12 depends from claim 1 and, therefore, is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

D. Cwenar and Lu

Claims 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cwenar in view of U.S. Patent No. 6,373,489 ("Lu"). This rejection is respectfully traversed.

Lu relates to interactive three dimensional (3D) computer graphics and geometry modeling. More particularly, Lu discloses methods for scalable visualization of interactive geometry modeling (Col. 1, lines 6-10). The methods may be used to visualize geological data representing a geoscience model of the characteristics of a geological region. (Col. 4, lines 18-20).

However, Lu does not teach or suggest information management systems for a hydrocarbon-producing portfolio, nor does it disclose a hydrocarbon-producing portfolio, as asserted by the Examiner.

The Examiner cites Col. 1, lines 14-21 of Lu for this assertion. Column 1, lines 14-21 of Lu discloses:

Geologists, geophysicists and petroleum engineers use models, including computerized models, of earth's crust to plan exploration and production of hydrocarbons and, to a lesser extent, other minerals. As hydrocarbons become more scarce, the accuracy of the computerized models becomes increasingly important to limiting the cost of locating and producing hydrocarbons and the associated cost of hydrocarbon products, such as gasoline and heating oil.

Lu discloses that geologists, geophysicists and petroleum engineers use computerized 3D models of earth's crust to plan exploration and production of hydrocarbons. Lu does not teach or suggest systems and methods for managing a hydrocarbon-producing portfolio, which involves dissimilar disciplines using dissimilar applications to manipulate dissimilar types of data. Not all data in a hydrocarbon-producing portfolio are amenable to 3D visualization. More importantly, Lu does not teach or suggest tying related data based on a key parameter field and updating the related data having a particular key parameter field when one of a plurality of applications modifies a data having the key parameter field.

Because Cwenar discloses methods for managing investment portfolio and Lu discloses methods for 3D computer graphic modeling, there would be no motivation to combine these non-analogous arts. In addition, Lu fails to provide that which Cwenar lacks with respect to claim 1. Therefore, claim 1 is patentable over Cwenar and Lu, whether considered separately or in combination. Claims 13 and 14 depend from claim 1 and, therefore, are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

E. Lu

Claim 28 was rejected under 35 U.S.C. §103(a) as being unpatentable over Lu . Claim 28 has been amended to clarify the recited invention. To the extent that this rejection applies to the amended claim 28, it is respectfully traversed.

As noted above, a unique problem in managing a hydrocarbon-producing portfolio lies in the diverse nature of properties, disciplines of the people and data involved. A single project in hydrocarbon production may involve a team including geoscientists, reservoirs engineers, administrators, drilling engineers, completion engineers, financial analysts, and field operators. Each of these team members needs to access data related to the project and be able to manipulate the data and provide updated data to other team members in a timely fashion.

A method for managing a hydrocarbon-producing portfolio, according to claim 28, includes: "having a plurality of asset team members each using an application related to a function of the respective asset team member to generate data relevant to the hydrocarbon-producing portfolio; the asset team members comprising at least two selected from a geoscientist, a landman, a reservoir engineer, a regulatory compliance administrator, a right-of-way administrator, a drilling engineer, a completion engineer, a finance analyst, a field operator, a sales and marketing representative, and a portfolio manager; and automatically updating related data that are tied to the generated data by a key parameter field."

As noted above, Lu teaches 3D computer graphics modeling of geological data. Lu does not teach a method for managing a hydrocarbon-producing portfolio. The Examiner asserts that Lu discloses a method for managing a hydrocarbon-producing portfolio, citing Col. 1, lines 14-21 of Lu for disclosing various team members involved in a hydrocarbon-producing portfolio,

and Col. 25, lines 34-36 of Lu for disclosing automatically updating corresponding data used by any other one of the applications.

Column 1, lines 14-21 of Lu are listed above. Column 25, lines 34-36 of Lu discloses:

With such extension, IGM mechanism for consistency management, interactive modeling, partial update, material property management, structural editing, save, restore, and so on, apply to SIGMA objects automatically.

These passages do not disclose generating data relevant to the hydrocarbon-producing portfolio and automatically updating related data that are tied to the generated data by a key parameter field, as recited in claim 28. Thus, Lu fails to teach or suggest all limitations of claim 28, and; therefore, claim 28 is patentable over Lu. Accordingly, withdrawal of this rejection is respectfully requested.

F. Lu and Armitage

Claims 29-40 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lu in view of Armitage. This rejection is respectfully traversed.

As noted above, Lu discloses methods for 3D computer graphics and does not teach or suggest the limitations recited in claim 28. Armitage discloses methods for analyzing seismic data. Combining the 3D computer graphics methods with methods for analyzing seismic data does not teach the method for managing a hydrocarbon-producing portfolio recited in claim 28. Specifically, neither Lu nor Armitage discloses generating data relevant to the hydrocarbon-producing portfolio and automatically updating related data that are tied to the generated data by a key parameter field.

Because Armitage fails to provide that which Lu lacks with respect to claim 28, claim 28 is patentable over Lu and Armitage, whether considered separately or in combination. Claims

29-40 depend from claim 28 and, therefore, are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

IV. Concluding Remarks

Applicant believes this reply to be fully responsive to all outstanding issues and place this application in condition for allowance. If this belief is incorrect, or other issues arise, do not hesitate to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 06558.007002).

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